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NEW DATA ON THE CONDITIONS OF FALL OF CZECHOSLOVAKIAN TEKTITES (VLTAVINES)

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[USSR]

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NEW DATA ON THE CONDITIONS OF FALL OF CZECHOSLOVAKIAN TEKTITES (VLTAVINES) *

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by G. G. Vorob'yev,
& G. Shkrov

The only known tektite field in Europe is located on the Czechoslovakian territory. It differs from other fields by the highest concentration of tektite matter, by a more ancient age and by better and more advanced state of study, direct consequence of the fact that it became known earlier than the other fields and that is is situated in a thicky-settled and easily-accessible region.

Despite the broad literature [1], the conditions of finding Czechoslovakian tektites (vltavines) and their genetic link with surrounding rocks heretofore remained obscure. The end of the geological investigation of that region and the edition of the map at the scale of 1 : 200 000 [2] in conjunction with the field operations conducted by the Czeske-Budeyovits Astronomical Observatory with participation of the Committee on Meteorites of the USSR Academy of Sciences [3, 4], allow a new approach to the pattern of fall of Czechoslovakian tektitic rain, of vltavine occurrence in the geological sediments and their redistribution in connection with subsequent geological processes.

The Czechoslovakian field is basically related to the South Czech syncline (trough) and to the eastern slope of the Czech-Moravian mountain range (in Moravia), and also to adjacent portions of the neighboring orographic subdivisions. The main waterways here are the Vltava river, with such tributaries as Luzhnitse, Mal'she, Otava and right-hand tributary of Morava — Die, with its tributary Yiglava. The total area of

* NOVYYE DANNYYE OB USLIVIYAKH VYPADENIYA CHEKHOSLVATSKIKH TEKTITOV (VLTAVINOV).

the field is 10 000 km^2. Among rock formations, the Proterozoic is most developed of all and is composed of paragneisses with acid intrusions and scattered outcrops of orthogneisses, granulites, splities and diabases. The Devonian and Carboniferous are very scarce. The South Czechian Syncline is the only one to include younger formations : Mezozoic (Upper Turonian and Senonian) and Cenozoic 'Tertiary), mainly Neogene deposits (see Fig. 1). In fact, the tektite-bearing deposits are Quaternary or Pleistocene alluvial, eluvial and deluvial formations and the Lower Neogene alluvial clays, composed at their base by sandy lenses and basal gravels, and substituted toward the top by lignites and diatomites, somewhat silicified at the hanging wall. It was noted that tektites have neither stratigraphic nor facies affinity. In the middle part of the field, namely at the core of the Czech-Moravian massif or mountain range, they are altogether absent.

The factual material studied has shown, that the region of fall of vltavines encompassed a substantially larger territory — of the order of tens of thousands square kilometers, with the Czech-Moravian range in the center, where the erosional denudation process of the ancient crystalline substratum was prevailing. In connection with this, the tektites were carried to the West and to the East, along the mountain slopes, and a single field was split into two parts — the South Czechian and the Moravian ones. This process lasted for a very long time and the tektites were distributed more or less uniformly along the cross section of the alluvium of the Neogene river pro-Vltava. As a result of subsequent faulting, the western , Czech-Budeyovits part of the syncline subsided; beyond it the Neogene was eroded and redeposited in the form of Quaternary sediments. This explains the relative scattering of tektite matter, with areas of local concentration by the contemporary hydrographic network. The principal areas of concentration are Vrabche, Slavche, Nesmen' and certain others.

Such a complex physico-geological history of vltavines was reflected in their dimensions, shape and character of surface (sculpture). Contrary to other tektites, they hardly preserved their original shapes, being disintegrated in the transportation process, downward along the moutain slopes. Contrary, for example, to australites, the specimens' frequency distribution curve by weight shows, that the extreme pulverization

is a distinct characteristic for the contemporary state of tektite matter in Czechoslovakia. - Partial or total polishing and rounding out of the debris of individual specimens is the result of post-Tertiary transport and resedimentation of vltavines. In connection with this, we introduced in practice an abrasion or polishing index (sculpture preservation), a scale to which corresponds a specific path of transportation (under normal conditions):

1.- Total rounding out (more than 15 km).

2.- rough polishing with preserved elements of sculpture (10 - 15 km);

3.- polishing and sculpture expressed to identical degree (5 — 10 km);

4.- rough sculpture (1 — 5 km);

5.- absence of polishing, the sculpture preserves the fine elements (to 1 km).

1221 samples were investigated in all. For the region to the NW of Czeske-Budeyovitse, the polishing index is 2.4 as an average, to the WNW it is 3.2, to the SW it is 2.9 and to SE it is 3.5. The average for the Southern Czechia is 3.3. By separate deposits, statistics show that some of them include vltavines of approximately the same polishing index (Grbov 3.5, Slavche 3.8), whereas in others, this index varies within greater and smaller limits, and in a series of cases (Garbzhi, Koroseki, Nesmen'), the curves of frequency distribution reveal two maxima, which is evidence of material concentration with different transportation paths. The completely rounded specimens are noted at nearly all the "deposits", and their average amount for South Czechia is nearly 10 percent of specimens with entirely preserved sculpture (in situ) are encountered more seldom (less than 7 percent); at the same time, either ones are characteristic for Vrabche.

The problem of subsequent investigations must consist in the detailed deciphering of transportation paths of vltavines and the working out of a field method for its estimate, which could be applied to other tektite fields.

*** THE END ***

Committee on Meteorites of the
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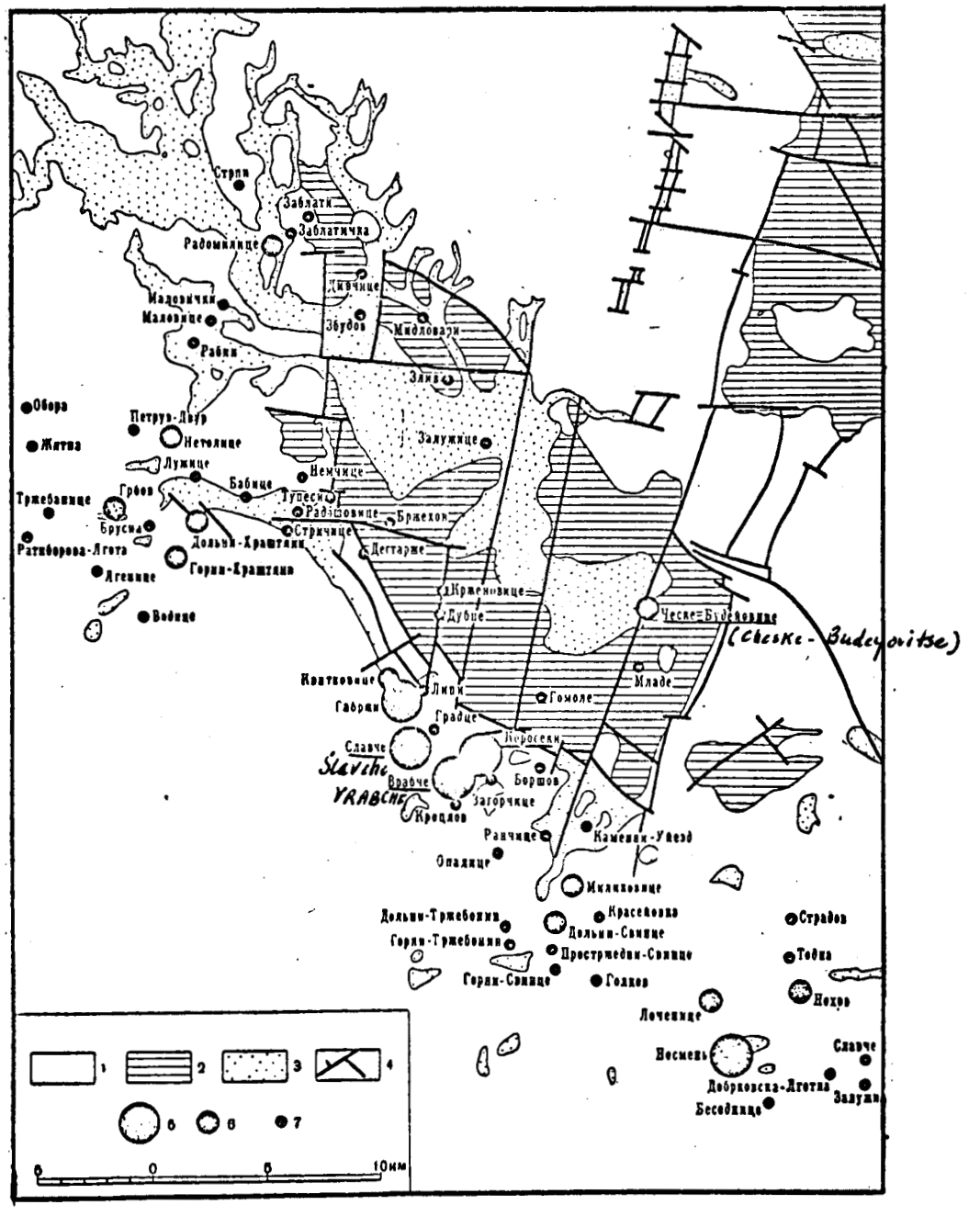
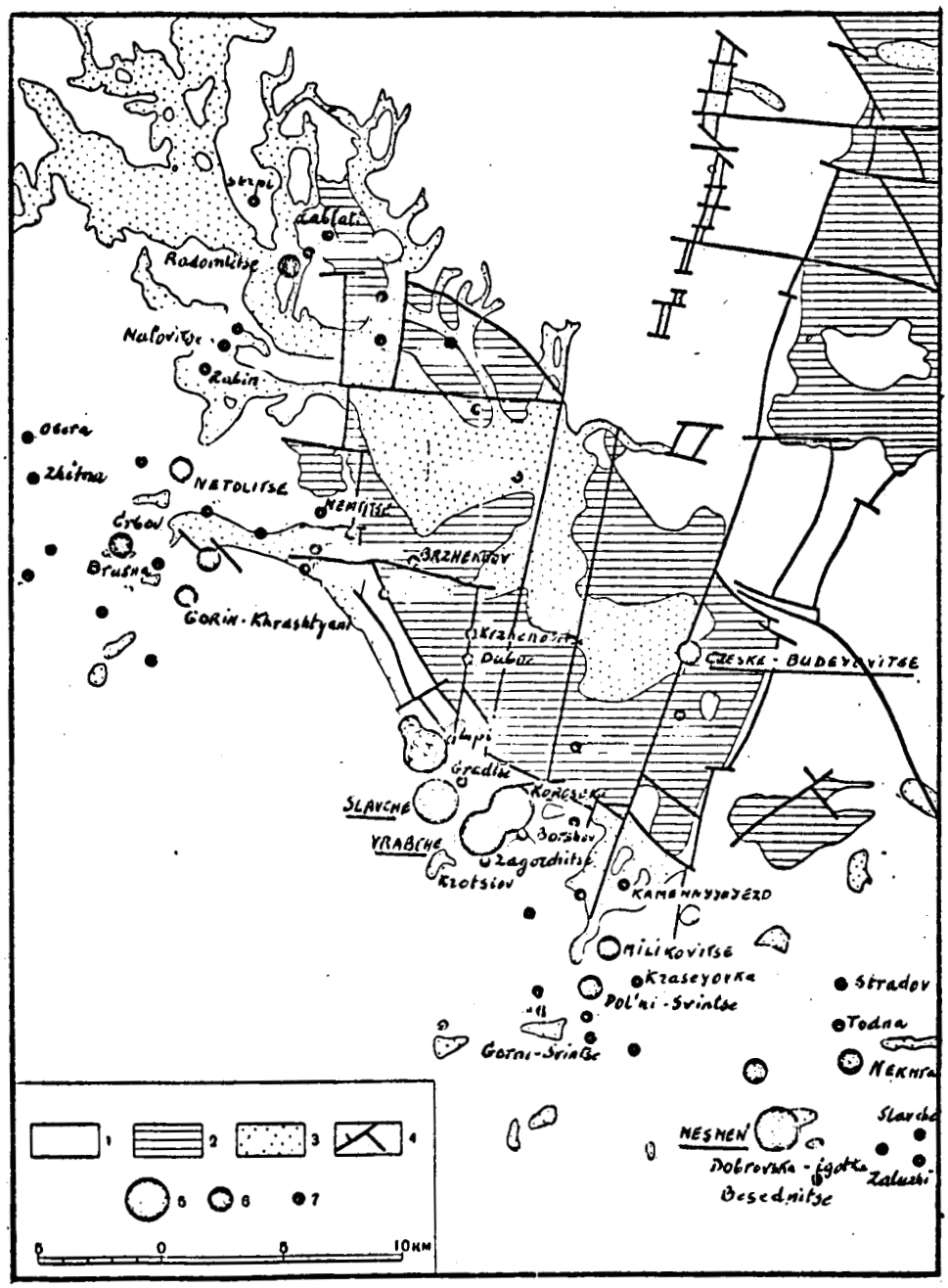


Fig. 1

1 – Proterozoic and Paleozoic; 2 — Mesozoic (Senonian);
3.- Neogene; 4 – Tectonic faults; 5 - major tektite deposits;
6.- Average tektite deposits; 7 — Minor tektite deposits.

[SAME MAP WITH SOME OF THE TRANSLITERATED TOWNS]



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